

CLAIMS

1. A method for polishing an object having raised and depressed pattern thereon to produce a flat and mirror polished surface by using an abrading plate, said method comprising:

polishing said object by supplying a liquid not containing any abrasive particles for a determined time period; and

further polishing said object by supplying abrasive particles so as to perform additional removal of a surface material to uniformly remove a specific film thickness.

2. A method according to claim 1, wherein said additional removal of a surface material is performed with said abrading plate by supplying a liquid not containing any abrasive particles for a specific duration, followed by additional polishing by supplying a slurry containing abrasive particles to said surface to be polished.

3. A method according to claim 1, wherein said additional removal of a surface material is performed by:

polishing using an abrading plate and supplying a liquid not containing any abrasive particles for a specific time duration, and

additional polishing while concurrently dressing said abrading plate with a liquid not containing abrasive

particles, thereby to generate free abrasive particles therefrom.

4. A method according to claim 1, wherein said  
5 additional removal of a surface material is performed by:

polishing using an abrading plate and supplying a liquid not containing any abrasive particles for a specific time duration, and

10 additional polishing using a polishing cloth and a slurry containing abrasive particles.

5. A polishing apparatus for polishing a surface of a substrate object having fine raised and depressed structures thereon by pressing said surface to an abrading surface of an abrading plate, said apparatus comprising:  
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a holder for holding said substrate object;

an abrading plate holder for holding said abrading plate;

20 a mechanism for pressing said surface of said substrate object to said abrading surface of said abrading plate while producing a sliding motion over a polishing interface;

a device for supplying a liquid not containing abrasive particles to said polishing interface; and

25 a surface material removal device for performing additional material removal by supplying abrasive particles, said device integrally mounted in said polishing apparatus.

6. An apparatus according to claim 5, wherein said surface material removal device is a device for supplying a slurry containing abrasive particles to said polishing interface.

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7. An apparatus according to claim 5, wherein said surface material removal device is a device for dressing said surface of said abrading plate so as to produce abrasive particles.

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8. An apparatus according to claim 5, wherein said apparatus is provided with a first polishing means to perform polishing while supplying a liquid not containing abrasive particles to said polishing interface; and a second polishing means to perform polishing while supplying a slurry containing abrasive particles to said polishing interface.

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9. A method for polishing a surface of a workpiece, comprising:

first polishing the surface of the workpiece with an abrasive surface comprising abrasive particles and a binder binding said abrasive particles in the presence of a liquid; and

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finish polishing the surface of the workpiece with a polishing surface that comprises a buffing pad in the presence of a slurry.

10. The method of claim 9, wherein the workpiece is held by a top ring during said first polishing and said finish polishing.

5 11. The method of claim 9, wherein the workpiece is polished while facing downward.

10 12. The method of claim 9, wherein the liquid used in said first polishing comprises water or an alkaline solution.

15 13. The method of claim 9, wherein said first polishing comprises polishing with self-generated particles from the abrasive surface.

14. The method of claim 9, wherein said first polishing comprises rotating the workpiece while pressing the workpiece against the abrasive surface.

20 15. The method of claim 9, wherein the abrasive particles of the abrasive surface comprise cerium oxide.

25 16. The method of claim 9, wherein the binder of the abrasive surface comprises resin.

17. The method of claim 9, wherein the resin comprises a phenol resin or a polyimide resin.

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18. The method of claim 9, wherein the abrasive surface is ring-shaped.

5 19. The method of claim 9, wherein the workpiece is a semiconductor wafer having fine surface structures thereon and convex and concave portions on the surface to be polished.

10 20. The method of claim 9, wherein the abrasive surface is harder than the buffing pad.

15 21. A method according to claim 9, wherein said abrasive surface is provided on a ring shaped grinding wheel.

22. A method according to claim 9, wherein said buffing pad is disposed on an outer peripheral part of said abrasive surface.

20 23. A method for polishing a surface of a workpiece, comprising:

25 first polishing the surface of the workpiece with an abrasive surface comprising abrasive particles and binder binding said abrasive particles in the presence of a liquid; and

finish buffing the surface of the workpiece with a



semiconductor wafer having convex portions on its surface to be polished.

32. A method of claim 23, wherein said finish buffing  
5 is conducted in the presence of abrading slurry.

33. A method according to claim 23, wherein said  
abrasive surface is provided on a ring shaped grinding  
wheel.

34. A method according to claim 23, wherein said  
buffing pad is disposed on an outer peripheral part of said  
abrasive surface.

35. A method according to claim 23, wherein said  
liquid is water.

36. A method according to claim 23, wherein said  
liquid is alkaline solution.

37. A method of claim 23, wherein the workpiece is a  
semiconductor wafer having convex and concave portions on  
its surface to be polished.

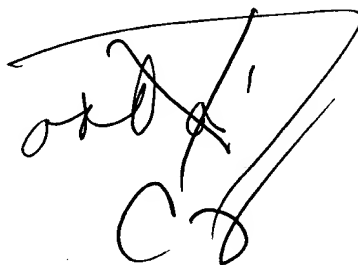
38. A method of claim 23, wherein said finish buffing  
is conducted in the presence of abrading slurry.

..39. A method according to claim 23, wherein said abrasive surface is provided on a ring shaped grinding wheel.

5 40. A method according to claim 23, wherein said buffing pad is disposed on an outer peripheral part of said abrasive surface.

10 41. A method according to claim 23, wherein said first polishing is performed in the presence of self-generated particles which are generated from the surface of said abrasive surface.

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